

in several developing countries, and contraceptive methods currently available. The final paper, by Colin Clark, is somewhat disappointing in a book which, to judge from the cover, sets out to examine population growth as "the major biological problem overshadowing the second half of the twentieth century", for about half the paper is concerned with basic factors affecting family size in past and present day societies. The emphasis, one feels, should have been on the economic and social implications of likely future developments.

The most remarkable essay is by John B. Calhoun. It links the two halves of the book physically and is a remarkable *tour de force* in that he casts his attention from the behaviour of rats in experimental habitats, through calculations of the population of western Guatemala in the sixteenth century to estimates of the optimum population of the world of 7,500 million. These are, he says, speculations which "the scientist often engages in but normally does not make public until several years later after the conclusion of studies generated by such speculation".

These speculations are based on the discovery that aggressive tendencies in rats developed at higher population densities the larger the initial size of the colony. He then goes on to argue that the totality of space that an individual is aware of around himself consists of physical space and "conceptual" space, that is, the "breadth of our insights and concerns in the arts, humanities, sciences and on the political and social scene". He sees extensions of conceptual space as compensating for reductions of physical space, but fears that there is currently occurring a reduction of both components. Overlapping conceptual space may lead to conflict even where there is no overlap of physical space. This was demonstrated by the behaviour of rats, but the sociologist might think of examples where human behaviour could tentatively be explained in such terms, such as the hostility by long standing residents to immigrants settling in their area. Although it has been shown that overcrowding existed long before new settlers arrived, nevertheless, the creation of overcrowding is frequently quoted as the justification for hostility. As Calhoun says, however, such speculations should be backed by several years of studies.

In all, this is a bitty book. If it does give, as it claims, a "biological perspective of man's predicament", this merely confirms that such a perspective is too myopic. The problems posed by population growth demand social and political perspectives and require social and political solutions.

D. R. COPE

THEORY OF POPULATIONS

Theoretical Population Biology

An international journal. Edited by J. F. Crow, N. Keyfitz, S. Karlin and R. MacArthur. Three issues per annum. (Academic: London and New York, 1970.) Private subscription \$10.00; institutions \$16.00.

"POPULATION" has a good chance of going to the top of the trendy protest charts. There is nothing trendy in the pejorative sense about this new journal, which aims to bring together papers on theoretical aspects of epidemiology, demography, population ecology and population genetics, although its appearance is opportune in view of the need for such a synthesis. Problems to be solved in this way include that perennial teaser, the genetic load, and the suggestion made recently in the *Lancet* (ii, 1249; 1968) that birth control will do genetic damage to the human population. There must also be rich gains in studying the relationships of genetic, evolutionary changes to the increasing exploitation of the environment, and their general effects on population dynamics or their influence

on epidemics. The urgent practical implications of this kind of theory for resource conservation, animal breeding and population control are not far to seek.

A distinguished international team of editors and associate editors ensures a high standard for the journal, although in the first issue they have not succeeded in making all the papers comply with the journal's format for abstracts and summaries. Some of the contributors are a bit happy-go-lucky about explaining the meaning of their mathematical symbols to the uninitiated (later editions please note); other papers are models of clarity. Misprints are of the minor kind that will not worry anybody familiar enough with the material to be using the journal in the first place.

The reader can gain some idea of the potential scope of the journal from the contents of the first issue: the definition of a function which can be used to predict the number of competing species in a habitat at equilibrium; the building of a probabilistic model to describe a population with individuals who grow older (some theories assume instantaneous birth and death); a study of the equilibria at two genetic loci under natural selection; a solution of the rate of fixation of two linked loci in a population of finite size, and another of the effect of migration between populations on the rate of fixation at a single locus; a discussion of the evolutionary usefulness of sex, and one of the optimum strategy for animal breeding programmes.

I feel that the papers which communicate best are those which give numerical examples; indeed, it seems likely that the necessary and difficult line of communication between mathematicians and biologists will increasingly be kept open by the high-speed computer, presenting results intelligible to the non-mathematician, especially as graduates of the more worthwhile biological science courses now have some training in programming.

This deserves to become an important journal, bridging the gap between several disciplines.

JOHN R. G. TURNER

INTERNATIONAL HEALTH

Building the Health Bridge

Selections from the works of Fred L. Soper. Edited by J. Austin Kerr. Pp. xxxvii + 567. (Indiana University: Bloomington and London, July 1970.) \$17.50; 167s.

ANY book on the history of medicine that may be written at the end of this century is bound to say that one of the principal achievements of the present generation was the degree of international collaboration in the field of public health. The national responsibility for detection, notification and control of communicable diseases is now being gradually extended to international bodies. In the age of jet planes and mass travel such an approach is more suitable than the legalistic and restrictive attitude of the early phase of quarantine regulations.

This book contains forty-five selected papers from the writings of one of the great American epidemiologists and medical administrators, but it gives more than the outline of the work of Dr Fred L. Soper, formerly of the International Health Division of the Rockefeller Foundation and of the US Public Health Service, the retired director of the Pan-American Sanitary Bureau, WHO Regional Office for the Americas. The volume covers one of the most exciting, fruitful and significant periods in the recent history of international health.

After an introduction and a brief biography of Dr Soper, it opens with the story of the survey and control of hook-worm in Brazil, Paraguay and other South American countries. It then deals with the eradication of yellow fever from Brazil, through the control of the peri-domestic mosquito, *Aedes aegypti*. The need for more accurate reporting of the disease led to the setting up of the